



The Position of Modern Biotechnology in Proving the Violation of the Living Right as a Right to Determine the Destiny

Adel Mohammadi¹, Abomohammad Asgarkhani^{2*}, Seyed Bagher Mirabbasi¹

¹Qeshm Branch, Islamic Azad University, Qeshm, Iran

²Faculty of Law and Political Science, University of Tehran, Tehran, Iran

Corresponding Author: Abomohammad Asgarkhani, Faculty of Law and Political Science, University of Tehran, Tehran, Iran.
Tel: +98-9123212505, Email: asgarkha@ut.ac.ir

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Abstract

The role of different sciences in the development of each other is quite clear and undeniable. Today, the application of scientific and laboratory facilities for discovering the truth and collecting evidence has increasingly extended and almost dominated the old methods. Hence, the era of probative evidence has been introduced as the age of scientific and legal evidence convergence. Meanwhile, applying the evidence provided through biotechnological methods has become commonplace among judges for achieving the certainty and getting persuaded. On the other hand, the right to life is on the top of the list of fundamental rights inherited to the human beings which accuse the action of physically removing any person or a group of persons for any specific and non-specific reason. Self-determination is another basic human right which knows people possessing the fundamental right to determine their own destiny by birth. In a legal biological system, scientific experiments providing physical, chemical, and mechanical evidence from laboratory and biological examinations will be taken as the basis of criminal evidence, known as forensic biotechnology. In the present paper, the role of forensic biotechnology in establishing the above-mentioned human rights is summarized.

Keywords: Forensic Biotechnology, Medical Evidence, Self-determination, DNA

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Introduction

Over the past two centuries, some countries have begun genocides and massacre against some human groups using chemical and biological means. The use of chemical and biological materials by the Ba'ath government in the Iraq-Iran war (against Iranian civils as well as its own people - the Shiites and Kurds) the use of chemicals by terroristic groups (in particular ISIS operations in Iraq and Syria), the use of Serbian bombs against Muslims of Bosnia and Kosovo are some of the most important occurrences of using biological weapons for purposeful destruction or targeted genocides. After convening the international tribunals, using the old methods of crime determination focusing on empirical sciences almost grounded the crime discovery and proving which could be considered basically rooted in two axes: (a) specific problems associated with traditional evidence collection methods such as confession and testimony; (b) the weakness of the information obtained from the crime scene in determining the nature of the criminal conduct and the characterizing the persons involved, in most cases.^{1,2}

Today, forensic science plays a pivotal role in crime

detection or investigation and confers the essential requisites for justice accomplishment using the evidence present in the crime scene. In the same regard, forensic biotechnology has been developed on the border of medical and forensic sciences and is increasingly applied in criminal investigations. Previously, forensic analysis mostly included the analysis of biological samples obtained from the crime scene. Biological evidence included the proteins in the blood samples (serology), other body fluids, and body tissues. Today, the growing breakthroughs in biotechnological methods, namely DNA fingerprinting, DNA foot-printing, DNA profiling, etc., have introduced the new field of DNA forensics. The pivotal technology that allows precise analysis of DNA samples is the polymerase chain reaction (PCR), which facilitates detecting the tiny fragments of the remained DNA in crime scene.¹⁻⁵

Thus, forensic identification comprises a combination of medico-legal identification and criminality identification, being completed with the expert's ability to compare the traces of probative value. Using forensic biotechnology, an expert can analyze the traces (e.g., blood, fingerprint, etc.) obtained from the crime scene in contrast to the traces from other

reference evidence such as materials found on a suspects' properties (e.g., clothes, weapon, etc.) or the victim.⁶

Despite the progressions in using scientific methods such as biomedical sciences, the medico-legal identification has been proved to still requires the axial contribution of specialists during investigation processes. The need for specialists gets more highlighted in cases of civil and criminal law, family law, and catastrophes with numerous victims (natural, accidents, wars, terrorist attacks, etc.).⁶ For scientific reasons, this tendency created the knowledge of "scientific police", which used the material found on the crime scenes such as blood drops, hair curls, fingerprints, etc. to detect the offender.

Expansion of Biotechnology Evidence System

One of the main reasons for spreading the biotechnological evidence through international trials is the rapid analysis of physical elements of the crime (including the conduct and evidence) helping the enforcement of justice against criminals.^{7,8} Scientific evidence is the means of obtaining the judiciary conscience, which has a facet of instrumentality and helps the "certitude" of the magistrate. The outcome has been establishing the "criminal law laboratories" and, consequently, the increasing referral of cases to these centers. According to the statistics released by the US Justice Department, 389 criminal law laboratories has been launched and operating in the field of criminal evidence, which by and large received and handled the evidence and documents of 2.7 million criminal cases in 2005.⁹

The role and effectiveness of scientific evidence are not limited to national criminal law. But, today, with the establishment of the International Criminal Court and the prosecution and litigation of international crimes, the use of these sciences in international criminal law is considerably increasing. According to the Article 44 of the Statute of the International Criminal Court, the clerk is required to collect and maintain a list of relevant scientific fields, being accessible to all pillar of the justice system and all litigants of the tribunal, when necessary. For this purpose, the clerk will try to identify reputable experts and delegations in fields such as forensics, guns, military sciences, law enforcement, psychology, etc. Therefore, these various sciences have been practically useful in the discovery of human remains, identification of the victims of international crimes, proving sexual violence, race determination in the course of pursuing genocide crimes (included in the field of legal anthropology) in several cases.¹⁰

During the recent international developments in fighting against some transnational crimes, including corruption and money laundering, experts have attained a particular position. Going beyond a mere expert, they are also playing role as a witness and/or informant. In the same regard, some provisions has been made on supporting and obliging experts for providing relevant information, within the law of Islamic Republic of Iran, including the law of IRI ratification of the United Nations Convention against Corruption (UNTC) (adopted in 2006, the anti-money laundering law adopted in 2007), the law of Promoting the Health of Administrative System (adopted in 2008), and the law of anti-administrative corruption.

Achievements of Medical Science in Providing Criminal Proof Evidence

The science-based evidence has been developed following the progression of science and technology in various fields around the world in recent years, especially in the second half of the twentieth century. Because of the non-legality and specialized nature of scientific methods, the present study surveys them just in term of crime prove and not from the perspective of their modality and methodology of their application. One of the most primary methods used in crime detection is the application of DNA information, which is rapidly expanding these days.¹¹ Using DNA or the genetic code of every individual identity becomes indispensable in criminal and retributive matters for several reasons which are implied in the following.

First, DNA is unique in individuals, and it is impossible and impractical to be repeated in another person.¹² Second, except the red blood cells which lack the nucleus- all cells in the human body and derivative samples, including blood droplets, seminal spots, skin, bone, hair follicles, etc contain DNA. Third and lastly, DNA extraction has come possible both in living individuals and also bodies that have passed away, even a long time ago. This method has been successful in identifying a large population of victims in mass graves after criminal occurrences in Iraq, Kosovo, Bosnia, etc. Sexual harassment is another common crime around the world, which mostly happens in internal armed conflicts on large scales. In this respect, "polymorphisms" in the genome play the most critical role. According to the human genome project, it can be seen that 95% of the human nuclear genome contains non-coding sequences, and only the remaining 5% relates to protein-coding genes. Noncoding sequences are located in different regions of the genome, each of which is termed as different names according to their sequence and place of positioning. Most of the non-coding sequences are similar in different individuals, while some of these sequences show a great deal of variation among the population. This diversity does not play a role in phenotypic or physiological characteristics- in other words, the life- of people and is usually transmitted from parents to children without change, but can be used for identifying their identity.¹³

Discovering seminal spots and vaginal leakages are of particular importance in sexual crimes and crimes involving sexual assault (such as female murdered following the sexual activity or rape) in order to prove the occurrence of crime and detecting the blood type and the genetic characteristics of the aggressor.¹⁴ Scientific evidence is not only used for proving the crime occurrence, but also to a significant extent for rejecting the allegations and accusations, and as a result, the acquittal of the accused.^{15,16} DNA fingerprinting (also called DNA profiling) as the forensic technique in criminal investigations, compares the criminal suspects' DNA profiles to the DNA evidence obtained from the crime scene and help to assess the likelihood of their involvement in the crime. Because, according to the regarding experts, every individual's DNA characteristics are as unique as fingerprints. Then, it is considered a significant achievement of empirical science and molecular medicine in the field of law.¹⁶

The Use of Biotechnology in Crime Investigation

Investigators scan the crime scenes for collecting or analyzing the evidence traces such as hair, skin, blood samples, or sperm, in order to find out the truth concealed behind the occurred incident. The principal tool of modern forensic medicine is using DNA profiles or genetic fingerprints. The main resources for obtaining DNA samples are blood, hair, sperm, saliva, bone, and tissue that are used not only in identifying individuals, but also in identifying a group of victims in crimes against a targeted genocide group. Therefore, forensic science utilizes the biotechnology techniques to provide accurate information that reveals the reality that has occurred in the crime. For this purpose, DNA analysis is used to identify a small amount of evidence remained from either a long time ago or the present time on a crime scene, which helps the law enforcement accurately. Consequently, biotechnology experts are going to be required to show up as witnesses in the court, too.³

Another pivotal technique is PCR, which provides investigators the possibility of amplifying the DNA molecules present in biological samples, even in a minimal quantity, into millions of exact copies. PCR is the underlying instrument that makes the DNA fingerprinting analyses feasible. DNA fingerprinting analysis employs two types of highly variable sequences from the human genome: VNTR (variable number tandem repeats) and STR (short tandem repeats). Every person has a unique and distinctive profile of VNTR or STR regions in their genome, which capacitate experts to identify an individual person. It was an important part of the investigations on the genocidal crimes and other serious criminals in Rwanda.³

In that case, the biotechnological experts carried out identification using particular experiments on the samples collected from the relatives and acquaintances of the victims, as well as their personal belongings such as toothbrushes (looking for oral salivary remnants), hair, etc.¹⁷

Various types of physical evidence may be found in various crimes. Almost no prosecution case is based just on singular DNA evidence. But, several other evidence, including fingerprints, footprints, teeth signs, physical evidence, crime scene examination, photographs from all crime scenes, and eyewitness records are accompanying the documents.¹⁷ Also, biological evidence is not limited to DNA samples. They include blood splash patterns, microbial information, blood group, etc. However, the physiological fluids such as blood, semen/sperm, animal or human dry liquids, and other samples are most frequently used for definitely determining the involvement of the offender or the suspected one in the crime. Using complementary physical evidence may even help to acquit a guiltless suspect. For example, if type A blood type is suspected, all people with blood types of B, AB and O can be excluded. Since such information cannot be evaluated at the crime scene, they should be gathered from the scene, examined in the laboratory, and then interpreted along with other acquired evidence.¹⁷

Fingerprinting

Fingerprinting helps in identifying victims in combination

with other sophisticated biochemical and immunological tests to identify the polymorphic genetic marker proteins, which specifically present in each individual. This possibility has come to action through recombinant DNA studies which introduced DNA polymorphisms and illustrated their efficiency in detecting an individual sexuality or unique profile using hormone analyses, semen-specific proteins assessments, or recombinant DNA techniques. The biological materials obtained from the crime scene can also be used for DNA hybridization techniques to determine the presence of a particular DNA sequence in a given individual's DNA or the species of an individual. This technique applies particular isolated DNA sequences, for example, the Alu transposable elements or those present on the human male Y chromosome and use them as a probe. Alu family are repetitive elements from short interspersed nuclear elements class in primate genomes, which are used to distinguish a human DNA from other species.²

Signs of teeth

Any signs of the teeth on the fruit or other symptoms of food or the bite of the victim may lead to criminal identification. In cases that the remains of a deceased person lacks probative value by visual or fingerprint methods, dental identification becomes important. Because teeth are of a hard tissue which remains after death and preserves their microstructure after heated to a temperature of 1600°C. Therefore, in cases that the victim corpse is either skeletonized, decomposed, burned, or dismembered, the odontological examination can help identification or characterization. This technique tells the experts about the changes of subjects' teeth through their life using a combination of observations on the sample decay, missing, filling, or the systemic comparison of pre and post mortem dental characteristics based on the person's dental records and probably available radiographs. However, trauma to jaws or inadequate ante-mortem dental information can make the odontological techniques problematic or even inapplicable. Accordingly, odontology dental identification is reported by the American Board of forensic as either positive identification, possible identification, insufficient evidence, or exclusion based on the provided evidence.¹

Physical Signs

Tire marks or tracking signs may help to determine the guiltiness of suspects. This factor is essential in the immediate identification of the crime. These types of evidence are implemented for the immediate detection of the location and time of crimes committing in a broad range of crimes.

Human Groups and Self-determination

The concept of "human group" has no definition rooted within the law; however, the similarity in characteristics such as citizenship, ethnics, physical and racial traits, religion, nationality, etc can beget a basis for considering human individuals as groups.¹⁸ Then, killing the individuals within each of above-mentioned group because of belonging to that particular group with a special purpose of the annihilation of that group, is considered as in opposition with their

right to self-determination. This is in agreement with the opinion of the International Criminal Tribunal for the former Yugoslavia (ICTY) in cases of Radovan Karadzic and Ratko Mladenovic.¹⁹ Obviously, former racist governments have extensively utilized the lapse of time as excuses to cover their crimes about human groups and acquittal. Whereas, now, the biotechnological and biomedical tests can precisely determine the ways of murders and the materials which have been used to violate the right to life. Accordingly, violation of the right to life is one of the most critical factors which is used to accomplish the self-determination right of human groups in international law.

Conclusions

Using biotechnological methods and techniques and their findings by the judges is established in especially retributive trials as probative evidence of a crime, in particular. Specifically, the genealogical evidence is politically upheld because they “guarantee the truth and reduce the judicial errors” to a great extent. In advanced countries, “DNA” is accepted as a formal and indubitable document and is individually considered for adjudication. In some specific cases, involving criminal tribunals of Yugoslavia and Rwanda, biological evidence has been able to help to prove the targeted killing of human groups with the aim of their annihilation. In the Rwandan Criminal Court, in particular, biological experiments have been used to discover the corrupted bodies and their ethnicity. Therefore, any intentional contravention of the right to life of any human groups will lead to the establishment of their right of self-determination.

Authors' Contributions

All authors participated equally in this study.

Conflict of Interest Disclosures

The authors declare they have no conflicts of interest.

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